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*Published in:*  
IT Management in Local Government

*Publication date:*  
2012

*Document Version*  
Accepted author manuscript, peer reviewed version

[Link to publication from Aalborg University](#)

*Citation for published version (APA):*  
Nielsen, P. A., & Persson, J. S. (2012). Engaged Problem Formulation of IT Management in Danish Municipalities. In J. Rose, J. S. Persson, P. Kræmmersgaard, & P. A. Nielsen (Eds.), *IT Management in Local Government: The DISIMIT Project* (pp. 13-25). Software Innovation, Aalborg University.

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# Engaged Problem Formulation of IT Management in Danish Municipalities

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**Abstract.** Municipalities' effectiveness in managing information technology (IT) is increasingly important in adhering to their responsibilities for providing services to citizens. While the municipalities' difficulty in managing IT has been well documented, it is more elusive what specific problems are most relevant in contemporary municipal IT management practice. On this basis, we present an engaged scholarship approach to formulate IT management problems together *with* municipalities – not *for* municipalities. We have come to understand such engaged problem formulation as joint researching and defining of a contemporary and complex problem by researchers and those who experience and know the problem. We present the formulated IT management problems and discuss the engaged problem formulation process in relation to engaged scholarship. Furthermore, we discuss how engaged problem formulation may contribute to action research when making sense of ill-structured problems by involving multiple stakeholders.

# 1 Introduction

Information technology (IT) can provide local government with significant opportunities for improving their services and efficiency (Ho 2002, Landsbergen Jr and Wolken Jr 2001, Eyob 2004). Local governments like municipalities are facing numerous problems in their efforts to become more mature in terms of e-government (Al-Sebie and Irani 2005, Layne and Lee 2001, Moon 2002). Significant management problems are evident by the high failure rate for e-government initiatives (Goldfinch 2007).

The political context of public administration and local government involve a large number of stakeholders and multiple tasks and considerations for IT management (Bannister 2002, Grimsley and Meehan 2007); concerns which traditional literature on IT management, e.g., (Luftman and McLean 2004, Weill and Ross 2004), seems to pay little attention to. These contextual characteristics indicate that municipalities' IT management challenges may be different from those already known from commercial companies (Caudle et al. 1991). On the other hand, in a comparison of the strategic priorities of public and private sector IT managers Ward and Mitchell (2004) found no significant differences.

Engaged scholarship is a recent general method for enhancing the relevance of research for practice (Van de Ven 2007) that is highly relevant for information systems research (Mathiassen and Nielsen 2008). Engaged means "negotiation and collaboration between researchers and practitioners in a learning community; such a community jointly produces knowledge that can both advance the scientific enterprise and enlighten a community of practitioners" (Van de Ven 2007, p. 7). While "scholarship means something more than research, and engagement is the means for scholarship to flourish" (Van de Ven 2007, p. 9).

In this chapter, we seek to contribute by showing how we have conducted an engaged problem formulation activity. We argue our approach to problem formulation is a contribution to engaged scholarship in general and specifically also to action research in information systems. In the process, we also illustrate our investigation of the problems faced by IT management in municipalities through engaged scholarship.

## 2 Research approach

The research project as a whole followed what Mathiassen (2002) has called Collaborative Practice Research. Collaborative practice research offers a research approach that assists us in connecting: (1) the need to understand the current IT management practices, with (2) the need to device artefacts to support IT management, and with (3) the need to improve IT management in the municipalities. It also suggests a structure for the research organization allowing the researchers and the IT managers to collaborate. It is a prudent choice of research methodology as we intended to advance research at the same time, as we wanted to advance the profes-

sional practice of IT management in municipalities. We were in accordance with engaged scholarship with its concern for both research contribution and practical usefulness (Van de Ven 2007, p. 2).

Overall, our research methodology is action research (Baskerville and Wood-Harper 1996, Baskerville and Wood-Harper 1998, Davison et al. 2004) as a general framing in which several research activities may be conducted (Mathiassen 2002). A particular concern in action research is how we explain the two cycles: the research cycle and the problem solving cycle (McKay and Marshall 2001) as they are distinctly different in their knowledge interest and yet intrinsically related. To this, we add more precisely the idea of engaged scholarship where a stronger position is taken with “a participative form of research for obtaining the different perspectives of key stakeholders (researchers, users, clients, sponsors, and practitioners) in studying complex problems” (Van de Ven 2007, p. 9).

The involved stakeholders in the municipalities influence how a problem is formulated. From a logical as well as an ethical standpoint the researchers are also just stakeholders and the researchers are rarely in full control of the problem situation (Avison et al. 2001) and let alone how problems are defined. Engaged scholarship is a collaborative form of research emphasizing how to obtain different stakeholders’ perspectives. The research process should thus be conducted in such a way that we can situate and ground our understanding of a problem situation and we can diagnose and infer problem definitions through our interactions with the different stakeholders based on how they experience the problem situation (Van de Ven 2007, p. 9).

On this basis, we take problem formulation to be an empirical process. Consequently, we collect and analyze empirical data as a significant part of the problem formulation process. What we take to be the problem(s) and how we thus formulate the problem(s) emerges from this empirical process. If we had planned this in detail and in advance and if we thus had taken full control, we could not maintain that we performed engaged problem formulation. Our planning was limited to the forming of the research organization and roughly outlining the first activities. Thereafter it was important to listen to the feedback from the involved stakeholders and document it.

### **3 Case and findings**

The engaged problem formulation activities were carried out as part of a research project with a formulated goal of investigating digital service integration through effective management of IT in Danish municipalities. The project organisation consisted of 12 Danish municipalities, 2 IT consultancy firms with extensive public sector experience and 12 IS researchers from different research departments.

The IT management problems of local governments were investigated at *four descending problem levels*: national, project, working group, and local as illustrated in figure 1. The research project organization is illustrated in the second col-

umn from the left, cf. figure 1. The figure furthermore includes the problem formulation activities carried out in the project in the third column along with the organization of the participating municipalities and consultancy firms in the fourth column. The relationships between organizational instantiations and activities are indicated in figure 1 as association (related to), generalization (a kind of), or aggregation (consisting of).

The problem formulation at the *national level* was conducted through an extensive quantitative survey of the IT managers in the 98 Danish municipalities conducted in May 2009. The problem formulation at the *project level* was conducted through in-depth interviews in 12 selected municipalities during 2009 with IT managers, municipal chief executive officers, and citizen service managers. Based on these problem formulation activities a 1-day joint seminar was held with all the main stakeholders presenting and discussing the overall potential IT management problems. Following the joint seminar, the research project advisory board decided which three problem themes were to be pursued by three *working groups*. Each of the three working groups involves representatives from the 12 municipalities with a particular interest in the working group's topic along with a representative from each of the two consultancy firms and at least two researchers responsible for the group. We limit this presentation to include details from working group #1 titled "Value creation".

The IT managers from four municipalities joined working group #1 together with two consultants and four researchers. The participating municipalities represent different perspectives on IT management. Six 1-day workshops have been held by the working group on issues often spanning several meetings: (1) problem definitions, (2) specific cases from the three municipalities, (3) a study of the research literature related to the working group topic, (4) a business case method, and (5) benefits management. At the *local level*, the improvement activities have been addressing what the current practices with business cases and in benefits management are and how they can be improved. The researchers have participated in improvement activities in each of the three municipalities. The first iteration in each municipality have taken a technique for IT business cases and adapted it in small sessions with the IT managers and other involved. The adaptation led to a business case method for Danish municipalities. The second iteration in two of the municipalities have specifically looked into how to perform benefits management and how it could be improved. This has led to a number of principles for benefits management in Danish municipalities.

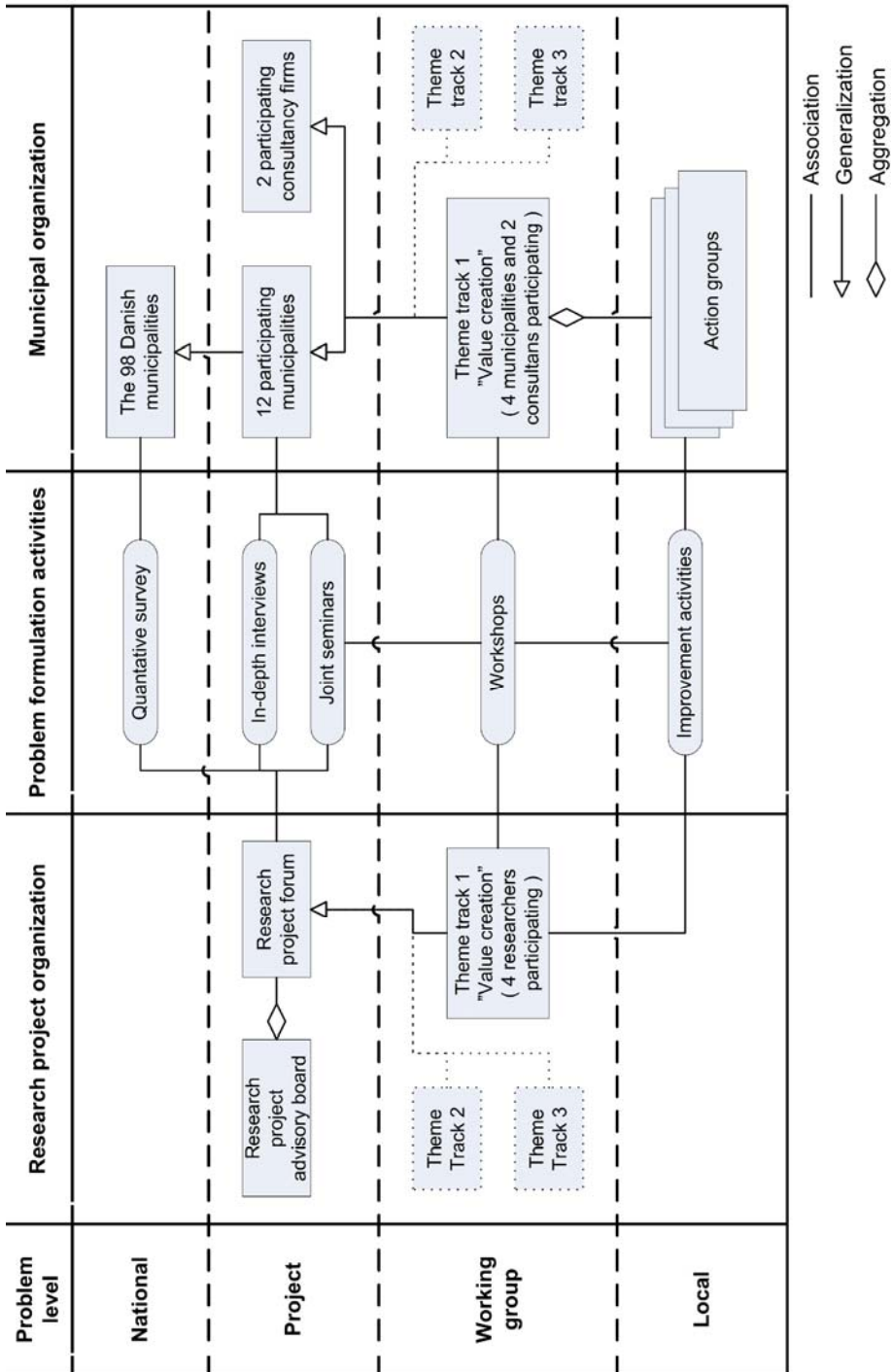


Figure 1: The organization of engaged problem formulation (Nielsen and Persson 2010)

In the following each of the 4 problem levels are illustrated and fed into the lower problem levels.

### **3.1 National level**

The initial knowledge interest was to understand the current maturity of IT management in Danish municipalities and the challenges these municipalities were facing when introducing IT to a larger degree in their administration and services. The CIOs in the 98 Danish municipalities were involved as stakeholders through a quantitative survey. The theoretical foundation of the survey was the literature on: maturity (Layne and Lee 2001, Siau and Long 2005), IT alignment (Chan and Reich 2007, Luftman 2000), and institutionalized organizations (Meyer and Rowan 1977). Questionnaires were sent out, completed and submitted electronically via the online tool SurveyXact. The survey had a response rate of 82%. The collected data were analyzed with *SPSS* using frequency and cross tables along with Chi-square and Gamma tests. The analysis revealed that many Danish municipalities are between level 2 and 3 on Siau and Long's (2005) maturity scale, where citizens and companies through websites can get information, use self-service solutions, download forms, and access other services. CIOs, furthermore, report consistent agreement and support for their IT strategy among the central managers in the municipal administration. Staffs do not express resistance against the use of IT in the municipalities. However, the municipalities' IT maturity is severely limited by: (1) limited reduction of traditional communication channels with citizens and companies; (2) limited integration between the internal IT systems and the self-service systems; (3) limited IT value-measurement despite a common practice of developing business cases for IT investments, and (4) low interest in e-government among municipal politicians. Hence, the problems identified at this level are the IT management challenges of reducing non-digital services, systems integration, benefits measurement, and interest of politicians and employees. These problems were fed into the lower problem level through a detailed report documenting the survey results (Nielsen et al. 2009) and through a 1-day seminar with CIOs from the 12 municipalities participating at the project level.

### **3.2 Project level**

The initial knowledge interest was the same as the national level, however, with a particular focus on developing an in-depth understanding of the participating municipalities' IT management problems in contrast to the more general understanding pursued at the national problem level. Additional stakeholders were therefore involved from 12 selected municipalities, including the municipal CEO, the citizen service manager, and the CIO. Overall, 36 semi-structured interviews were conducted, recorded, transcribed, coded, and analyzed in order to identify the major IT challenges in these municipalities. More than 600 individual challenges was identi-

fied and categorized into 5 general problem themes documented in a report (Kræmmergaard et al. 2009) distributed to the project participants.

The Results from the survey at the national level and the 5 problem themes were presented and discussed at the 1-day seminar. Based on this, the research advisory board consisting of the principal investigators and the municipal CIOs decided to focus on three themes in the working groups: (1) value creation, (2) strategic execution and portfolio management, and (3) social alignment and communication.

### **3.3 Working group level**

The initial knowledge interest in working group #1 on value creation was described as “IT from cost to value creation in Danish municipalities.” The topic was chosen by the CIOs because they had to face their CEOs on the issue of whether the municipalities are getting sufficient value for money with IT and whether that can be documented. Six full-day workshops have been held.

The first workshop addressed four potential problem definitions at the working group level. The four candidates were: (a) an IT business case process for a municipality, (b) stakeholder management techniques, (c) business process innovation, and (d) IT benefits realization. At the end of the workshop it was jointly decided to focus on an IT business case process.

At the second and third workshop the CIOs presented how they worked with the form and contents of IT business cases and examples of business cases were studied. These experiences were discussed in great detail. The researchers had coded the business case examples from the municipalities for differences and similarities and the results were discussed. Further, the researchers presented relevant research literature on IT value, on IT business cases, and on the government’s business case model. The discussion at these workshops led the working group to a deeper understanding of the challenges faced by the participating municipalities.

At the fourth workshop the researchers presented the results from the previous workshops integrated with ideas for a business case technique from the literature. This empirical process gradually led to a decision to narrow the problem definition to the question of whether a particular IT business case approach (Ward, Daniel et al. 2008) could be adapted to Danish municipalities and then evaluated through improvement activities in a few municipalities (Nielsen and Persson 2011, 2012).

The fifth and sixth workshop gradually moved the attention to benefits management as a set of activities embedding the business case approach. It led to the realisation that the municipalities had to improve their benefits management activities.

### **3.4 Local level**

The improvement activities at the local level addressed each participating municipality’s local problems. The initial problem formulations at the local level stem from what was learned through the workshops at the project level. We know so far



that the three participating municipalities are different when it comes to how they use IT business cases and how they view benefits realisation. These differences will have to be addressed to cater for the problems at the local level, as the local stakeholders perceive them. The initial problems are:

- Municipality 1: A small municipality with 4,000 employees where the IT department has already some isolated experience with business cases. The IT department is pushing the application of IT in different departments when the business case is simple to understand for all stakeholders, but they have yet no experience with complex business cases let alone with benefits realisation.
- Municipality 2: A large municipality with 18,000 employees experienced in working with complex business cases. The IT department has a progressive IT policy where a minimal business case is first established and then other features, their costs and benefits are bundled with the initial business case. The experience with benefits realisation is so far very limited.
- Municipality 3: A medium-size municipality with 6,000 employees that has a rather high local tax income. The municipality has IT as a main driver in providing service to citizens. The IT department has extensive experience with business cases and the challenge seems to be to create better overview and limiting details. There is some early experience with benefits realisation, but it has not yet reached a form where it can be planned and monitored.

## **4 Discussion**

This investigation has a contribution on how to approach engaged problem formulation.

### **4.1 The problems formulated**

The problems identified at the national level were the IT management challenges of reducing non-digital services, systems integration, benefits measurement, and interest of politicians and employees. An early investigation of key IT management issues in the US public sector (Caudle et al. 1991), identify integration of technologies as the highest rated challenge. Systems integration seems a very persistent challenge in public sector IT management, which is not surprising considering the many different services supported by different IT systems in these often large and complex organizations. The interests of politicians and employees can also be related to educating elected officials, which was a high rated issue specifically at the county level compared to the federal and state levels (Caudle et al. 1991). However, in this study of Danish municipalities, educating elected officials appear reduced to the less ambitious goal of simply maintaining the interest of politicians

and employees. Measurement of benefits has also been identified in a previous study of issues in US public IT management in term of measuring IS effectiveness (Swain et al. 1995). Planning was the most significant issue in the study by Swain et al. (1995), pointing in the direction of managerial above technical challenges in public sector IT. In a later study of issues in the Greek public sector, new IT human resources and extending use of office automation was identified as the most important (Loukis and Tsouma 2002), thus the highest rated issues varies across studies. In these earlier studies of public sector IT management issues, the reduction of non-digital services was not included. This suggest reducing non-digital services is a problem becoming more conspicuous when reaching higher maturity levels (Layne and Lee 2001, Siau and Long 2005) considering Denmark's high ranking in e-governmental readiness (UN 2008).

The problems identified at the project level were in collaboration with the municipal CIOs limited to the three most relevant, which were 1) value creation, 2) strategic execution and portfolio management, and, 3) social alignment and communication. Strategic execution and portfolio management along with social alignment and communication corresponds to the strategic planning and IT organization alignment issues indentified as critical in the multinational study by Watson et al. (1997). Value creation can be compared to the lower rated issue in increasing understanding of IT's role and contribution (Watson et al. 1997).

The CIOs participating in the value-creation working group perceive the development of effective business cases as a key problem in municipal creation of value through IT. Value is thus predominantly defined from a municipal perspective and less from the state and citizens' perspectives. While IT business cases has been suggested as an effective tool for addressing public sector IT challenges (Gil-García and Pardo 2005), CIOs raised several concerns regarding what should be included in the business case and how it should be used. Previous research has in a similar way pointed to limitations of the business case for transformational and experimental IT investments (Ross and Beath 2002). In addition, the municipal CIOs argued centrally outlined business case models, such as the one developed by the Danish government, may be inappropriate to the different local government contexts. We therefore seek to introduce state of the art in IT business case development (Ward et al. 2008) to the Danish municipal case of local government, while critically evaluating what problems it may address along with what new problems it may create.

## **4.2 The approach to engaged problem formulation**

Action researchers at all time have emphasized it is the client's problem that has to be solved (McKay and Marshall 2001). It is very often a complex process to deal with ill-structured problem situations (Checkland and Holwell 1998, Checkland and Scholes 1990). Checkland avoids in his Soft Systems Methodology the pitfall of tight coupling between a defined problem and a solution by eliminating the need to formulate a problem. The problem situation is thus improved through the prob-

lem-solving process without an explicit problem definition. This illustrates well how action research processes are closely linked with problem-solving processes (Chiasson et al. 2008). We conduct engaged problem formulation where we pay particular attention to what we as researchers should do in addition to solving problems together with clients. Stating the problems, documenting the problems and how they are understood, scrutinizing the problem definitions, and never taking a given problem for granted must be part of the research process. Action research per se has little to offer on how to organize the problem formulation process. We have therefore added both a research organization in levels and a levelled formulation process in the pursuit of a well-grounded problem understanding.

The problem formulation approach is engaged scholarship as Van de Ven (2007) defines it, cf. section 2. First, we have kept track of different stakeholders at four levels. Second, we have recorded and documented their different interests, experiences, and views. Third, we have used this in a dialogue with the interested stakeholders to formulate the problems to be addressed in the research collaboration.

Researchers of organizations, management, and information system usage suggest studying a single level is severely limiting research (Klein et al. 1994, Klein et al. 1999, Hitt et al. 2007, Burton-Jones and Gallivan 2007). The core of the argument is that issues at one level cannot be comprehended without paying some attention to the level above and vice versa. In the problem formulation process, we have described the area of concern through descending levels of analysis. Each level had its own research design and these have been intrinsically related, cf. figure 1. What we have done is a form of multilevel analysis by descended four levels. If we treat the ascending levels with a similar empirical approach then we can perhaps do more than logical generalization and actually perform upwards empirical analysis after the improvement activities.

## 5 Conclusion

We have reported from an on-going research project where we have first and foremost committed to addressing what problems persist in local governments' IT management.

We have described how we have performed the process of engaged problem formulation. Inspired by Van de Ven (2007) we define engaged problem formulation as: *joint researching and defining of a contemporary and complex problem by researchers and those who experience and know the problem*. This activity is carried out by situating, grounding, diagnosing, and inferring the problem up close and from afar by engaging those who experience and know the problem at multiple levels. The goal of such activities is to jointly produce knowledge of this problem that can both advance the scientific enterprise and enlighten a community of practitioners. We have illustrated how we went through descending levels of problem definitions and how the formulation at all four levels have been grounded in em-

pirical data collection and analysis. We have then discussed the findings and how they relate to the existing literature on IT management problems for local governments. We have further discussed how our engaged problem formulation approach is a contribution to a better understanding of how we conduct engaged scholarship and how that informs action research.

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